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Fermilab

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Booster Watchdog Crates

The Watchdog Crate is a Nuclear Industrial Module (NIM) crate. In Booster, its purpose is to monitor the Central Utility Buildings (CUB) 95 Low conductivity water (LCW) system. The Central Utility building distributes its 95 LCW to both Booster Galleries and the Boosters Tunnel. Each of the Booster galleries contains a High Level Radio Frequency (HLRF) Watchdog crate. Its location is within the Radio Control Center (RCC) relay racks. The local Internet Rack Monitor (IRM), which is a Controls Systems RCC Front End Node, also located at each RCC rack monitors each of these crates digitally for module trips. This is done by the Watchdog Crate interface Module (0437.01-ED-62667) which monitors each slot for a fault and is interfaced to the IRM. The IRM'S ADC monitors the Watchdog Modules Analog output signals.

The digital data retrieved by the IRM is displayed on Booster Page 25 (High Level RF Status) under the Watchdog sub page. The analog data can be viewed from any ACNET Parameter page. The device names are as follows.

Booster Tunnel

B:TLCWSP Tunnel 95 LCW Supply Pressure
B:TLCWRP Tunnel 95 LCW Return Pressure
B:TLCWC Tunnel 95 LCW Conductivity
B:TLCWT Tunnel 95 LCW Temperature

Booster East Gallery

B:ELCWSP East 95 LCW Supply Pressure
B:ELCWRP East 95 LCW Return Pressure

Booster West Gallery

B:WLCWSP West 95 LCW Supply Pressure
B:WLCWRP West 95 LCW Return Pressure
B:WLCWC West 95 LCW Conductivity
B:WLCWT West 95 LCW Temperature

Booster Watchdog Module Types

As mentioned earlier the system monitors the 95 LCW Supply and Return Pressures, Conductivity and Temperature of the water. The pressure and temperature modules are designed to report high level limits and the conductivity module is designed to report low level limits.

The Watchdog Crate also contains a module defined as the Cavity Water Leak Module. This module, which monitors a Cavity Water Leak daisy chain, notifies the Control System if there is a HLRF Cavity water leak in the Booster Tunnel. The cavity water leak daisy chain is an RG58 cable stretched across the High Level RF System, Station to Station. At each of the stations this cable is T-Off to the Modulator External Interlock Unit (MEIU) module in the RMU rack. This MEIU monitors the signal coming from the stations cavity water leak Micro Switch that is located under the lower Booster RF Cavity Tuner.

In the East Gallery, the Watchdog Crate contains Watchdog Modules for both the Tunnel and the East Booster Gallery.

Watchdog Module Schematic Drawing Numbers

Watchdog Conductivity Module DWG#: 0337.01-EC-63453
Watchdog Supply and Return Module DWG#: 0337.01-EC-63452
Watchdog Temperature Module DWG#: 0337.01-EC-63491

Sensors and Measuring Device Part Numbers

Conductivity Meter:	Beckman Industrial Solu Meter Conductivity Controller Model: SM1
Conductivity Cell:	Beckman Industrial Model: 431 (0.01/CM)
Supply Transducers:	Setra Systems Natick Mass USA Model 205-2 0-500 PSI
Return Transducers:	Setra Systems Natick Mass USA Model 205-2 0-100 PSI

Temperature Sensor Probe: Analog Devices AD2626

95 LCW Sensors and Measuring Device Locations

The Booster Tunnels 95 LCW supply and return pressure Setra Systems transducers are located in the Booster East Galleries Period 16, by RF station 6, behind this stations RMU rack on the wall. The Booster Tunnels 95 LCW Temperature probe and Conductivity electronics monitor is located in the Booster East Galleries Period 14, by RF station 4, behind this stations RMU rack on the wall.

The Booster East Galleries 95 LCW Supply and return pressure transducers are located in the Booster East Galleries Period 17, by RF station 7, behind this stations RMU rack on the wall

The Booster West Galleries 95 LCW Supply and return pressure transducers are located in the Booster West Galleries Period 23, behind MH2 on the wall. The Booster West Galleries 95 LCW Temperature probes and Conductivity electronics are also located in this same area.